

Maine EMS



EMT-Intermediate Narcan Module

August 2002

UNIT TERMINAL OBJECTIVE

At the completion of this unit, the EMT-Intermediate will be able to incorporate assessment findings to formulate a field impression and implement a treatment plan for the patient with an opioid overdose.

COGNITIVE OBJECTIVES

At the completion of this unit, the EMT-Intermediate will be able to:

1. Define drug abuse. (C-1)
2. Define the following terms: (C-1)
 - a. Substance or drug abuse
 - b. Substance or drug dependence
 - c. Tolerance
 - d. Withdrawal
 - e. Addiction
3. List the most commonly abused opioid drugs (both by chemical name and street names). (C-1)
4. Describe the pathophysiology of commonly abused opioid drugs. (C-1)
5. Recognize the signs and symptoms related to opium and opioid drug abuse. (C-1)
6. Correlate the abnormal findings in assessment with the clinical significance in patients using opium and opioid drugs. (C-3)
7. Describe the treatment and pharmacological intervention in the management of opium and opioid drug abuse. (C-3)
8. Describe the equipment needed, techniques used, precautions, and general principles of administering medications via an endotracheal tube. (C-3)
9. Describe the equipment needed, techniques used, precautions, and general principles of administering medications via intramuscular injection (IM). (C-3)

AFFECTIVE OBJECTIVES

None identified for this unit.

PSYCHOMOTOR OBJECTIVES

At the completion of this unit, the EMT-Intermediate will be able to:

1. Demonstrate administration of a medication via an endotracheal tube.
 2. Demonstrate administration of an Intramuscular (IM) medication.
-

Drug Abuse

The term *drug abuse* refers to the use of prescription drugs for non-prescribed purposes or the use of drugs that have no prescribed medical use.

Drug abuse in America is widespread and common among all socioeconomic, cultural, and ethnic groups, affecting individuals of all ages and backgrounds.

Because of the widespread use and misuse of drugs, EMS personnel must maintain a high degree of suspicion and consider the possibility for a drug related problem in any patient who has seizures, behavioral changes, stupor, or coma.

Drug Abuse Terminology:

Drug Abuse: Self-medication or self-administration of a drug in chronically excessive amounts, resulting in psychological and/or physical dependence, functional impairment, and deviation from approved social norms.

Drug Dependence: Condition marked by an overwhelming desire to continue taking a drug for its desired effect, usually an altered mental activity, attitude, or outlook.

Psychological Dependence: Emotional reliance on a drug (Manifestations range from a mild desire for a drug to craving and drug-seeking behavior to repeated compulsive use of a drug for its subjectively satisfying or pleasurable effects.)

Physical Dependence: An adaptive physiological state occurring after prolonged use of many drugs (discontinuation causes withdrawal syndromes that are relieved by re-administering the same drug or a pharmacologically related drug).

Tolerance: A tendency to increase drug dosage to experience the same effect formerly produced by a smaller dose.

Withdrawal Syndrome: A predictable set of signs and symptoms that occurs after a decrease in the amount of the usual dose of a drug or its sudden cessation.

Addiction: Compulsive, uncontrollable dependence on a substance, habit, or practice.

Etiologic Factors of Drug Abuse:

A characteristic to most drugs that cause dependence is that they are initially taken because the individual believes that a desirable pharmacologic effect will result. Since very few drugs or substances without central nervous system effects are abused, one of the most predominant factors contributing to drug abuse appears to be intrapsychic – a desire to alter one's state of mind.

Commonly Used Opioids:

The commonly abused opioids come from natural sources (opiate), the semi-synthetic group, and the synthetic group. The term "opioid" is preferred because it refers to both natural and synthetic products that have morphine-like effects.

Heroin, Codeine, hydromorphone (Dilaudid), oxycodone (Numorphan), meperidine (Demerol), levorphanol (Levo-Dromoran), methadone (Amidone, Dolophine), D-propoxyphene (Darvon), pentazocine (Talwin), oxycodone combinations (Percodan, Percocet), Fentanyl, and Morphine.

Common opioid street names include: Dreamer, Junk, Smack, Horse, School Boy, Dover's Powder

Mode of Administration:

The opium derivatives generally can be administered percutaneously (absorbed through the mucus membranes) by sniffing (snorting), by subcutaneous injection (skin popping) or by direct IV injection (mainlining). The rate of absorption is correspondingly increased, with mainlining producing almost immediate drug effects.

Mechanism of Action and Effects:

Opium derivatives are CNS depressants that probably act on the sensory cortex or higher centers and thalami. Because they can relieve pain, change or elevate mood, relieve tension, fear, and anxiety and produce feelings of peace euphoria, and tranquility, they are particularly likely to lead to physical and psychologic dependence. The individual "high" on opioids is often described as being "on the nod" – drowsy, content, and euphoric. The drugs do not produce hallucinogenic effects.

Opioids are **agonist** analgesics. The term "agonist" means "to do or to activate", and the term "antagonist" means "to block". Various opioids are classified as agonist, partial agonist or mixed agonist-antagonist medications. An agonist drug binds with the receptor(s) to activate and produce the maximum response of the individual receptor, whereas a partial agonist produces a partial response. A mixed opioid agonist-antagonist drug will produce mixed effects; it is a drug that acts as an agonist at one type of receptor and as a competitive antagonist at another receptor.

The mechanism of action for opioids is related to their binding to specific opioid receptors in and outside of the Central Nervous System. The primary opioid receptors concentrated in the CNS are mu (μ), kappa (κ), delta (δ), and sigma (σ) receptors. Analgesia has been associated with the first three receptors, with limited research on the delta receptor. Therefore the primary analgesic receptors at this time are the mu and kappa receptors. The sigma receptors are primarily associated with psychotomimetic or unwanted effects, such as dysphoria, hallucinations, and confusion.

The agonist analgesics (morphine, hydromorphone) activate both the mu and kappa receptors while agonist-antagonist agents (butorphanol, nalbuphine, and pentazocine) activate kappa receptors (agonist) and block or have minimal effects on the mu receptors (antagonist). The agonist-antagonist drugs (especially pentazocine) may induce the undesirable effects associated with sigma receptor activity.

In addition to analgesia, opioids are capable of altering perception and emotional responses to pain because the receptors are widely distributed in the CNS, especially in the spinal and medullary dorsal horn, limbic system, thalamus, hypothalamus, and midbrain. When these areas are stimulated, pain perception is inhibited.

Acute Overdosage:

Acute overdosage of opioid substances may result in severe pulmonary edema and respiratory depression. These outcomes are dose dependent and are related to the degree of individual tolerance. Symptoms occur rapidly in most patients.

Signs & Symptoms:

Opioid toxicity is manifested in various ways, such as slow, shallow breathing; cold, clammy skin; miosis (pinpoint pupils [may not occur in meperidine overdose]); impaired coordination; severe hypoxia; severe acidosis; bradycardia (meperidine overdose may cause tachycardia); hypotension; muscle spasm; lethargy; respiratory depression; seizures; urinary retention. The presence of thrombophlebitis, scarred veins, and puckered scars from subcutaneous injections may help identify the patient with opioid toxicity. The classic triad of opioid overdose consists of miosis, respiratory depression and decreased level of consciousness.

Opioids tend to delay urination and gastric emptying time, so that revival of the patient may increase peristalsis and thus further increase absorption of the drug, producing a coma cycle.

Management of an Opioid Overdose:

General:

Ensure scene safety and be prepared for unpredictable patient behavior.

Provide symptomatic and basic supportive care of airway, breathing, and circulation (the ABC's).

Obtain a history of the event, and past medical history.

If possible, identify the substance and consult with medical control.

Initiate IV therapy, and administer naloxone (if ordered).

Transport to the hospital.

Specific:

If apnea is present, maintain a patent airway using oxygen and assisted or controlled respirations as necessary.

When the triad of miosis, respiratory depression, and decreased level of consciousness appears, the administration of naloxone (Narcan) is indicated.

Naloxone, a pure narcotic antagonist, reverses opioid toxicity. Naloxone is inactivated orally, but is very effective parenterally. Its onset of action is 1-2 minutes (IV), and its half-life is between 60 and 100 minutes. Naloxone is widely distributed throughout the body, and also crosses the placenta. It is metabolized in the liver and excreted via the kidneys. The usual adult dose is 0.4 to 2.0 mg given intravenously, which may be repeated at 2-3 minute intervals if necessary. Larger doses may be required to treat acute overdoses of butorphanol (Stadol), nalbuphine (Nubain), propoxyphene (Darvon and Darvocet products), methadone (Amidone, Dolophine), and pentazocine (Talwin).

Support blood pressure and maintain respiration after response to naloxone (Narcan). A positive response to naloxone is characterized by dilation of the pupils (if previously miotic), and an increase in respiratory function, blood pressure, and cardiac rate.

Naloxone reverses apnea and coma within minutes and should be titrated to the patient's arousal with a respiratory rate in a range of 10-20 breaths per minute. Patients with opioid overdose can rapidly become combative and violent when given naloxone, and precautions need to be taken to ensure that both the patient and care providers are adequately protected from injury. Continued patient monitoring is necessary because naloxone is shorter acting than most opioids, often necessitating additional doses to prevent the reemergence of opioid toxicity. Unlike the diabetic patient who may respond to D50 and refuse transport, **patients of opioid toxicity must be transported for continued medical care due to the risk of reemergence of opioid toxicity with respiratory failure and death.**

Other Opioid Antagonists:

Naltrexone (Trexan) is an oral medication used in long-term programs for opioid addiction.

Nalmefene (Revex) appears to be as effective as naloxone in acute intoxications and has a longer duration of action (4-8 hours) than naloxone.

Administering Narcan by Intramuscular (IM) Injection:

Maine EMS Protocol allows the trained EMT-Intermediate to administer Narcan via an Intramuscular (IM) injection. When administering medication via this route, the EMT-I should follow these steps:

1. Assemble and prepare the needed equipment (BSI, alcohol prep, medication, 5 ml syringe, 21-23 gauge hypodermic needle 3/8" – 1" long).
2. Apply BSI and confirm the drug, indication, dosage, and need for intramuscular injection.
3. Draw up medication as appropriate.
4. Prepare the site with an alcohol prep. (Deltoid, Dorsal Gluteal, Vastus Lateralis, Rectus Femoris)
5. Stretch the skin taut over the injection site with your nondominant hand.
6. Insert the needle just into the skin at a 90° angle with the bevel up.
7. Pull back the plunger to aspirate tissue fluid.
 - If blood appears, the hypodermic needle is in a blood vessel, and absorption of the medication will be too rapid. Start the procedure over with a new syringe.
 - If no blood appears proceed with step 8.
8. Slowly inject the medication
9. Remove the needle and dispose of it in a sharps container.
10. After administration, gently rubbing or massaging the site helps to initiate systemic absorption.
11. Place an adhesive bandage over the site.
12. Monitor the patient.

Administering Narcan via an Endotracheal Tube:

Maine EMS Protocol allows the trained EMT-Intermediate to administer Narcan via an endotracheal tube when there is no IV access available. When administering medication via this route, the EMT-I should follow these steps:

1. Ensure proper tube placement by direct visualization, End-Tidal CO2 or Esophageal Detection Devices, and auscultation.
 2. Ensure adequate oxygenation and ventilation of the patient's lungs.
 3. Prepare the medication so that it is 2 times the intravenous dose, and flush with up to 10ml LR/NS.
 4. Hyperventilate the patient's lungs.
 5. Remove the air source from the ET tube and inject the medication directly into the tube followed by the LR/NS flush.
 6. Resume ventilations with several large ventilations to help ensure that the medication gets as deep into the pulmonary tree as possible.
 7. If CPR is underway at the time of endotracheal medication administration, stop compressions momentarily while you administer the medication and until several ventilations are given. Otherwise, the drug may be forced back up and out of the endotracheal tube.
 8. Monitor the patient for the desired therapeutic effect and any possible side effects.
-

Psychomotor Objectives Worksheet

Intramuscular Injection

Procedure	Yes	No
1. Takes BSI precautions.		
2. Elicits patient allergies, explains procedure.		
3. Selects correct medication.		
4. Checks label for correct name, concentration, expiration date.		
5. Inspects medication for discoloration, particles.		
6. Prepares correct amount of medication.		
7. Chooses and cleanses injection site appropriately.		
8. Rechecks correct drug and dose.		
9. Inserts needle at 90° angle, aspirates for blood return.		
10. If no blood return, injects medication at appropriate rate.		
11. Properly disposes of needle.		

Endotracheal Drug Administration

Procedure	Yes	No
1. Takes BSI precautions.		
2. Selects correct medication.		
3. Checks label for correct name, concentration, expiration date.		
4. Inspects medication for discoloration, particles.		
5. Prepares correct amount of medication.		
6. Hyperventilates patient.		
7. Removes ventilation device.		
8. Administers the medication down the endotracheal tube.		
9. Replaces the ventilation device and hyperventilates the patient.		
10. Monitors patient for desired and undesired effects.		
11. Properly disposes of needle.		

**Maine EMS
EMT-Intermediate Protocol**

Adult Coma (gold 3)

INTERMEDIATE

Below #8: Contact Medical Control for administration of Naloxone (Narcan) 0.4-2.0 mg IV, ET, IM as bolus or titration dose.

Pediatric Coma (pink 1)

INTERMEDIATE

Below #5: Contact Medical Control for administration of Naloxone (Narcan) 0.4-2.0 mg IV, ET, IO as bolus or titration dose.

Toxins, For Narcotics (yellow 5)

INTERMEDIATE

Below #3: Contact Medical Control for administration of Naloxone (Narcan) 0.4-2.0 mg IV, ET, IM as bolus or titration dose of 0.2 mg IV increments (to maximum 2 mg) to restore normal respiratory rate (be aware that patient may become combative and may need restraint).

NALOXONE (NARCAN)

Class: Narcotic antagonist

Description

Naloxone is an effective narcotic antagonist. It has proved effective in the management and reversal of overdoses caused by narcotics or synthetic narcotic agents.

Mechanism of Action:

Naloxone is chemically similar to narcotics. However, it has only antagonistic properties. Naloxone competes for opiate receptors in the brain. It also displaces narcotic molecules from opiate receptors. It can reverse respiratory depression associated with narcotic overdose.

Indications:

Naloxone is used for the complete or partial reversal of depression caused by narcotics including the following agents: morphine, Demerol, heroin, paregoric, Dilaudid, codeine, Percodan, fentanyl, and methadone. It is also used for the complete or partial reversal of depression caused by synthetic narcotic analgesic agents including the following drugs: Nubain, Talwin, Stadol, and Darvon. Naloxone may be used in the treatment of coma of unknown origin.

Contraindications:

Naloxone should not be administered to a patient with a history of hypersensitivity to the drug.

Precautions:

Naloxone should be administered cautiously to patients who are known or suspected to be physically dependent on narcotics. Abrupt and complete reversal by naloxone can cause withdrawal-type effects. This includes newborn infants of mothers with known or suspected narcotic dependence.

Side Effects:

Side effects associated with naloxone are rare. However, hypotension, hypertension, ventricular arrhythmias, nausea, and vomiting have been reported.

Interactions:

Naloxone may cause narcotic withdrawal in the narcotic-dependent patient. In cases of suspected narcotic dependence, only enough of the drug to reverse respiratory depression should be administered.

Dosage:

The standard dosage for suspected or confirmed narcotic or synthetic narcotic overdoses is 1 to 2 mg administered IV. If unsuccessful, then a second dose may be administered 5 minutes later. Failure to obtain reversal after two to three doses indicates another disease process or overdosage on non-opioid drugs.

How Supplied:

Naloxone is supplied in ampules and prefilled syringes containing 2 mg in 2 ml of solvent. In addition, vials containing 10 ml of the 1mg/ml concentration are also available.
